

DoD Global Emerging Infections Surveillance & Response System (DoD-GEIS)

Global Influenza Surveillance Efforts

8 January 2007

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**For presentation to:
DoD/CDC Working Group Meeting**



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Lab-Based Influenza Surveillance



- **Sentinel Surveillance**

- Air Force Institute for Operational Health (San Antonio, Texas)

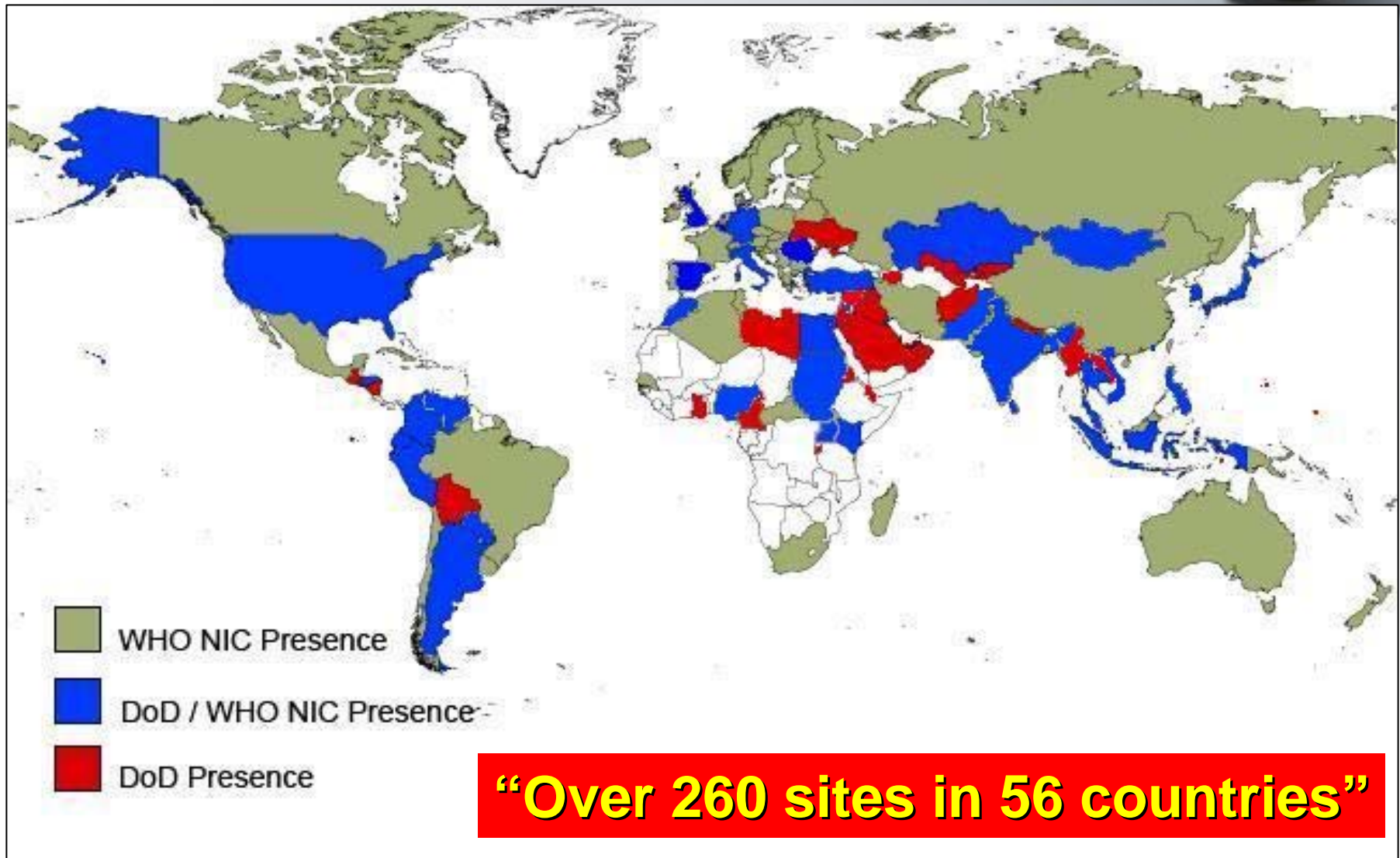
- **Population-based Surveillance**

- Navy Health Research Center (San Diego, California)

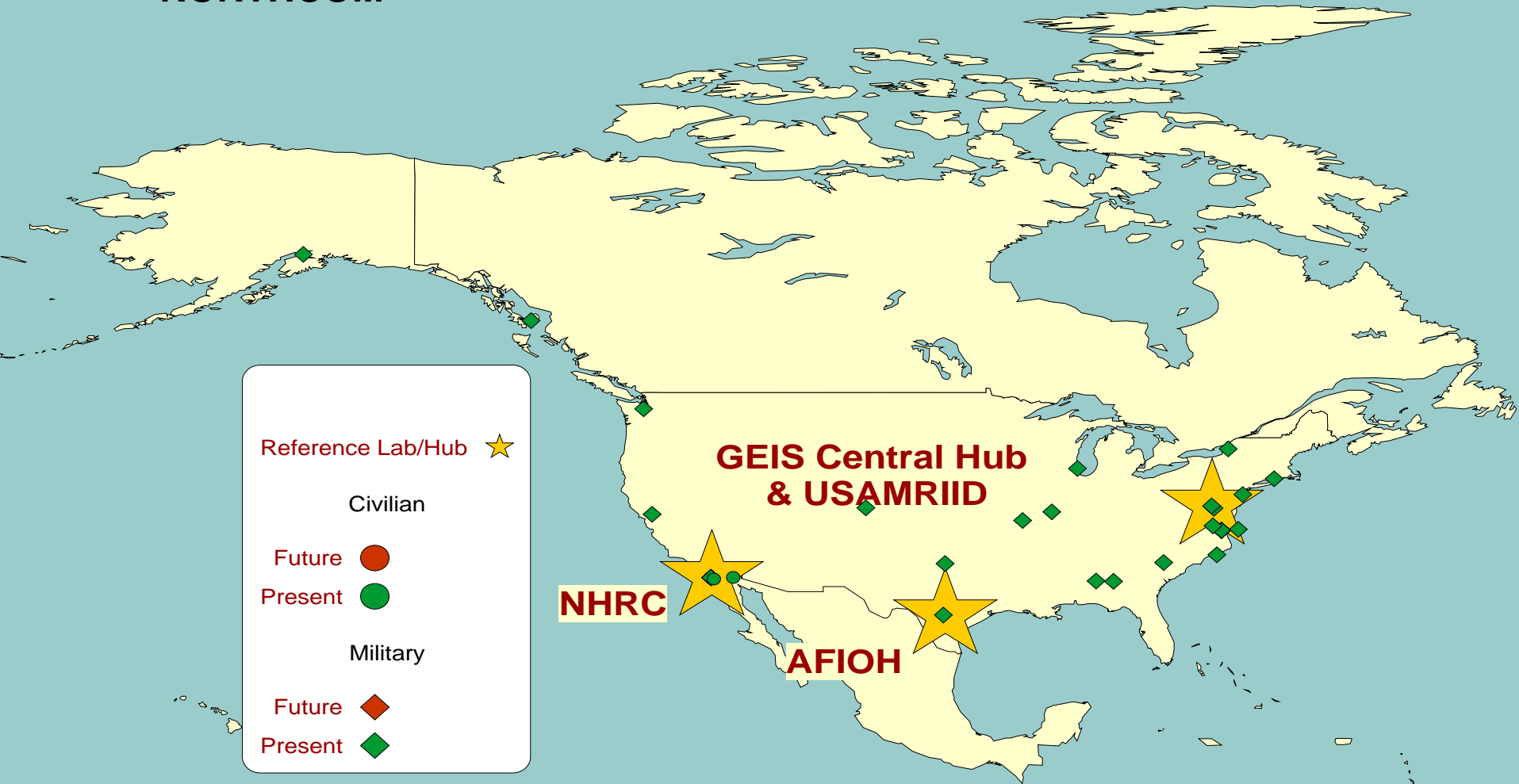
- **International Surveillance**

- NAMRU-2 (Jakarta, Indonesia)
- NAMRU-3 (Cairo, Egypt)
- NMRCDC (Lima, Peru)
- AFRIMS (Bangkok, Thailand)
- USAMRU-K (Nairobi, Kenya)

Influenza Surveillance by DoD



NORTHCOM





**Armed Forces Research
Institute of Medical Sciences
(AFRIMS)
Bangkok, Thailand**

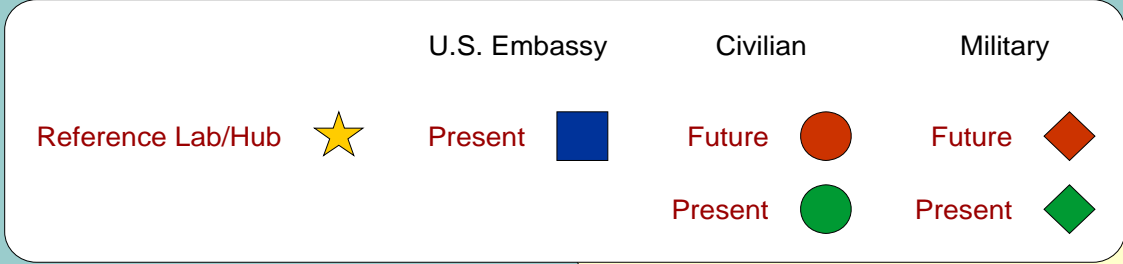
PACOM

18th MEDCOM

AFRIMS

NAMRU-2

Inset: Hawaii



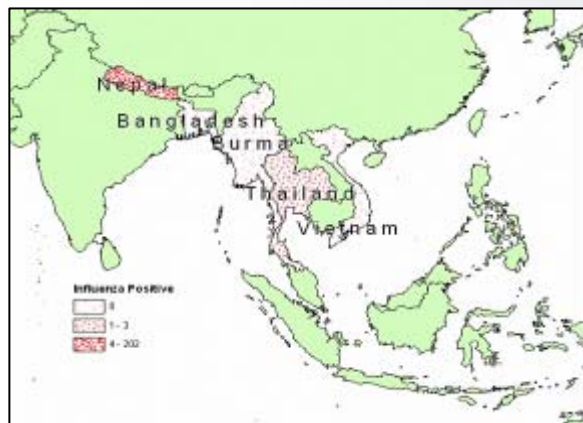
16 Countries Presently

20061201



AFRIMS

Highlights of AI/PI Work in FY06/07



- Sentinel surveillance sites established in Nepal, Thailand and the Philippines and at regional US Embassies
- Philippines: New sites in early FY07
- Nepal-based Influenza surveillance network:
 - Detected H1N1 and H3N2 strain emergence in Jun-Jul 04-05
 - Jul-Aug 06 outbreak with 174 cases sampled by WARUN staff
 - H3N2 subtype similar to vaccine strain for 2006-07 (Wisconsin-like strains)





AFRIMS

Highlights of AI/PI Work in FY06/07



- **US Embassy site reporting from 11 countries in region**
- **Internet-based reporting from Thai civilian hospitals in 18 key provinces and 6 RTA hospitals in border areas of Burma, Laos, Cambodia & Malaysia**
- **Build-up of new BSL-3 laboratory in Bangkok**
- **PCR lab in Burmese border in FY07**
- **Upgrade of Vet Med BSL-3 facility**



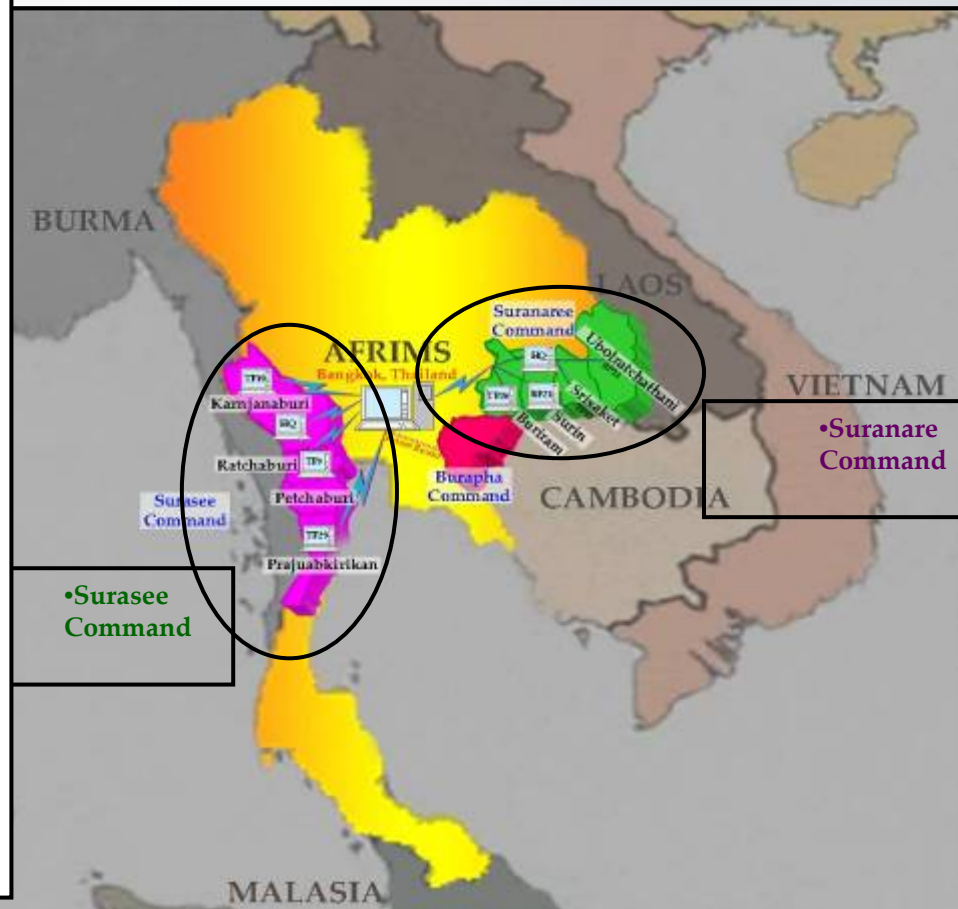
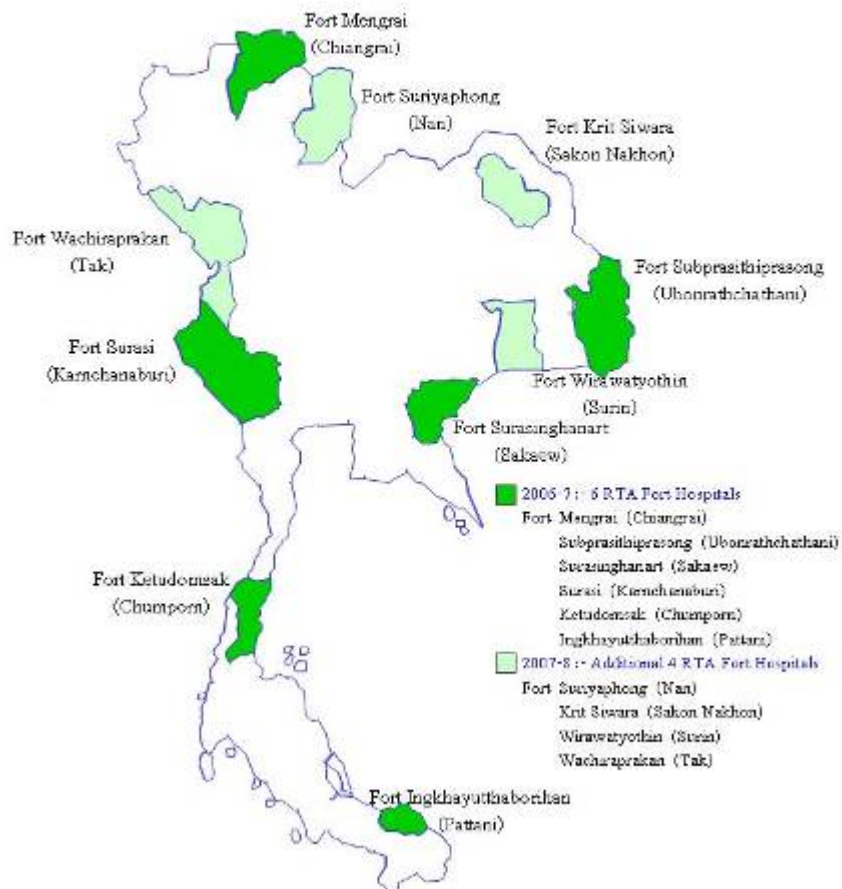
RTA Influenza & Unit-based Surveillance



RTA Influenza Surveillance

■ 2006-7 :- 6 RTA Fort Hospitals

■ 2007-8 :- Additional 4 RTA Fort Hospitals





AFRIMS

Human Capacity Development



- Partnering with CDC, WHO and Thai MoPH
- Training of rapid response teams (Jul-Aug 06)
- USUHS-based outbreak detection and response course (Aug 06)



Close Collaborations are Key!



**CDC-IEIP, Thai MoPH
and WHO**

Royal Thai Army (RTA)



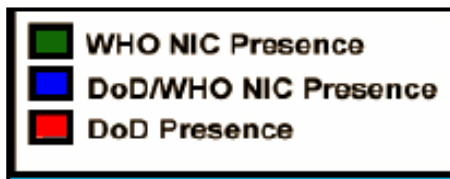
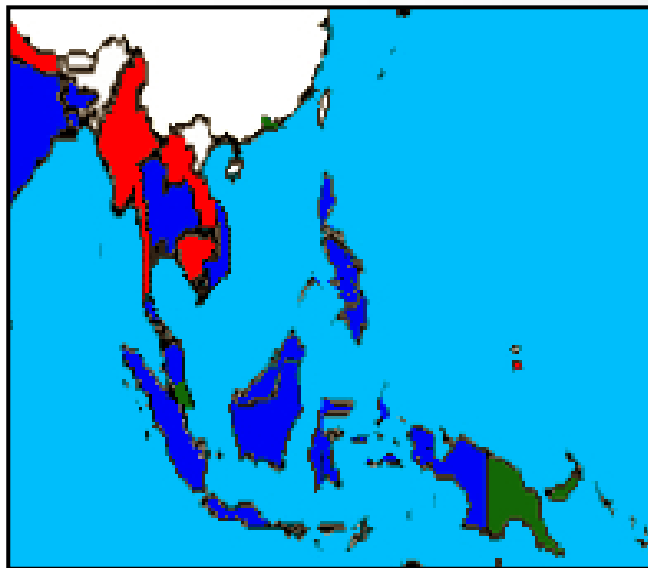


**Naval Medical Research Unit
Number 2
(NAMRU-2)
Jakarta, Indonesia**



NAMRU-2

Highlights of AI/PI Work in FY06/07



- Surveillance sites in 3 countries
- BSL-2+ Labs in Jakarta & Phnom Penh
- Collaborative Lab in Vientiane (at NCLE)
- Singapore Diagnostic Lab Platform
- Key Studies in FY06-07:
 - Longitudinal cohort study of 600+ households in Cambodia & Thailand (H1-H9 surveillance; w/ Univ of Iowa-CEID)
 - Remote sensing & environmental risk factor modeling project
 - Migratory and domestic bird surveillance
 - Pediatric and Influenza-like illness study



NAMRU-2 Diagnostic Capability

ILI Outbreak & Case Investigation Support



- Molecular biology laboratory with sequencing capability
- H5N1 real-time RT-PCR screening before culturing
- Supports Indonesian MoH and WHO: Identify human and animal H5N1 cases
- Only in-country reference lab for work-up of avian and human influenza samples (referral to CDC influenza lab)
- Source of three H5N1 strains (A/Indo/5/05) - Clade 2 vaccine development by the CDC/NIH
- New BSL-3 Lab Suite being built at NIHRD (mid-FY07)



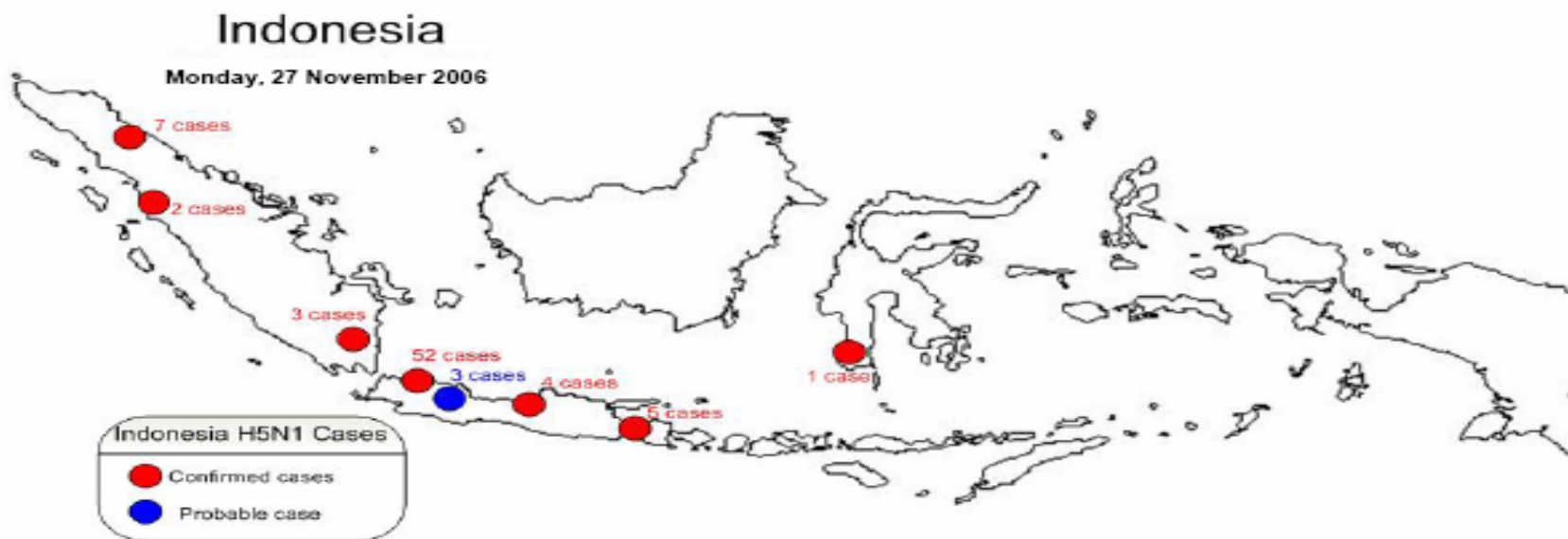


NAMRU-2

Jakarta, Indonesia



- NIHRD, WHO and CDC collaboration during Medan H5N1 cluster investigation in northern Sumatra (May 06)
- NIHRD and CDC investigative support for all H5N1 suspected cases
 - Total of 74 confirmed cases (Jun 05-Nov 06), young age
 - Cases sampled within 24 to 48 hrs (37 H5N1 virus isolates)
 - High-level mortality (57 deaths, 77%)
 - Eleven familial clusters identified (Jun 05-Nov 06)



**NAMRU-2 Team
supporting poultry
investigation
around human
H5N1 case
investigation**

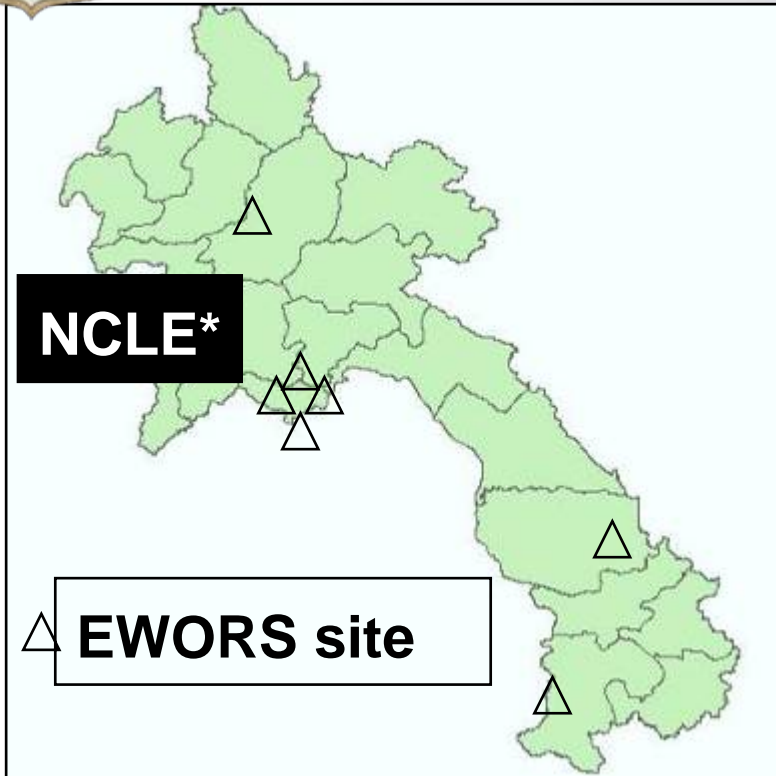


**NAMRU-2 Team collecting
samples from a suspected
human H5N1 case in an ICU**





EWORS Syndromic Surveillance Lao PDR



- ILI hospital-based surveillance (NCLE) in Vientiane
- Total of ten sites (4 central, 7 provincial) in network collaborating with CDC and local MoH
- Daily & Weekly reporting to NCLE
- Weekly reports to sites & MoH
- Day-to-day phone contact for potential outbreaks and further definition of cases
- Well-developed analysis & reporting procedures





Migratory Bird Surveillance Indonesia-FY06



- Five Java island sites
- Sampling of domestic poultry & waterfowl (ducks), wild resident & migratory birds
- Over 5,000 samples collected
 - H5N1 screening of ~700 samples (8 positive, 1 wild bird)
 - 1:1 domestic:wild bird
- Training of Indonesian Ecology Health Status Research & Dev Center and NIHRD scientists at Univ Iowa's CEID





**US Army Medical Research
Unit-Kenya
(USAMRU-K)
Nairobi, Kenya**

EUCOM

LRMC

Inset: LRMC Region

Reference Lab/Hub



Civilian

Future



Present



Military

Future

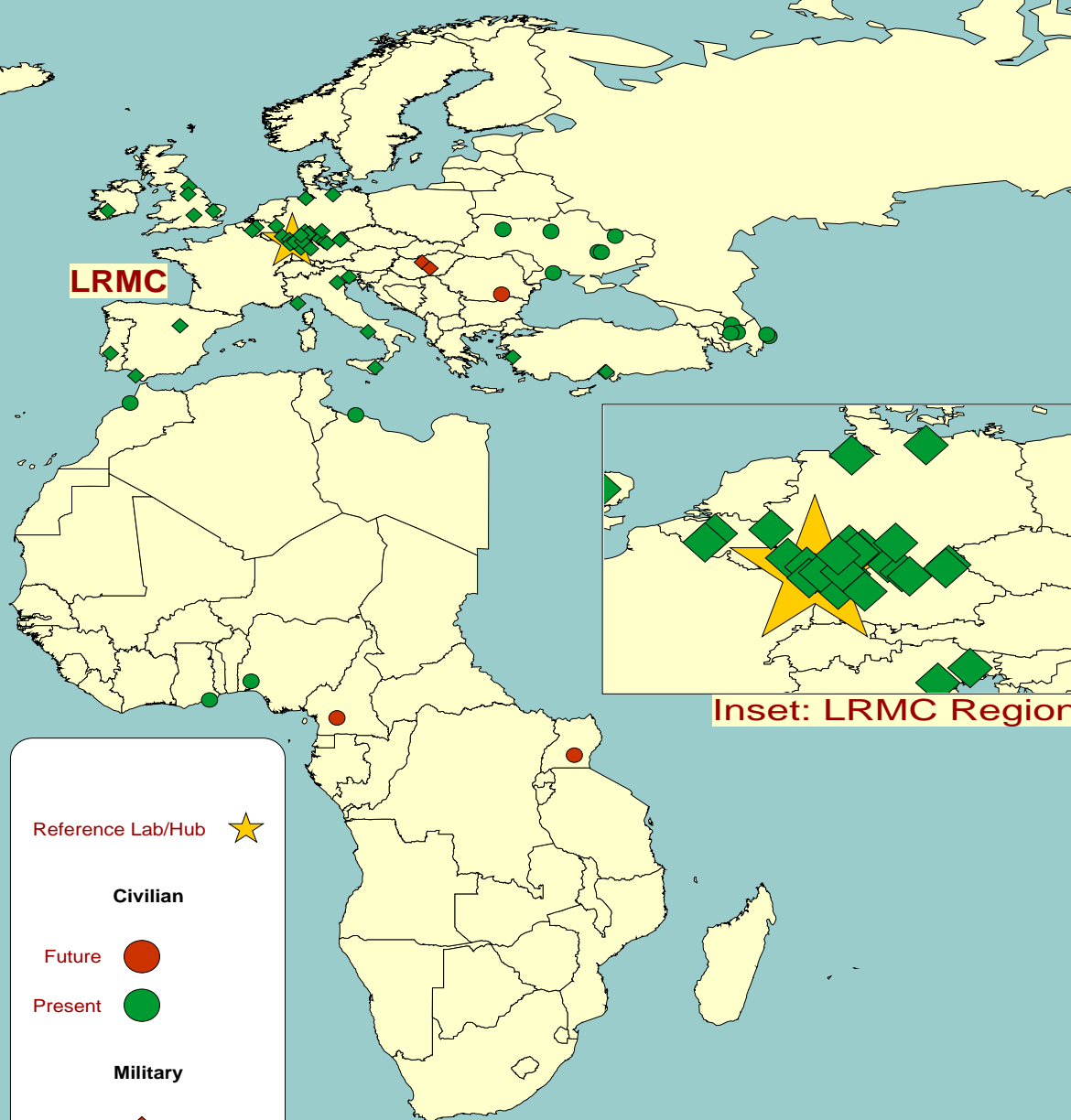


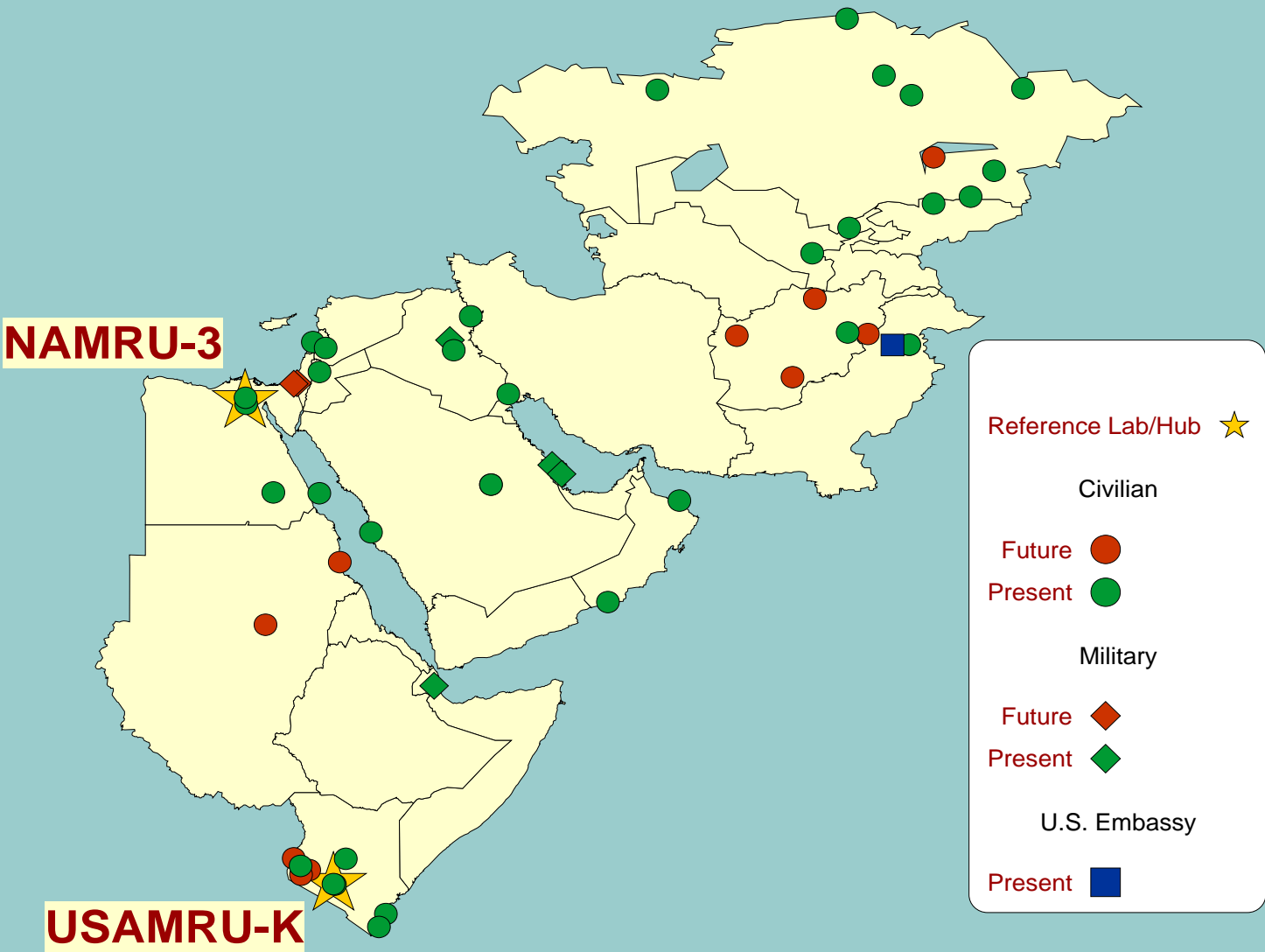
Present



13 Countries Presently

20061201







USAMRU-K

Influenza Surveillance-Background

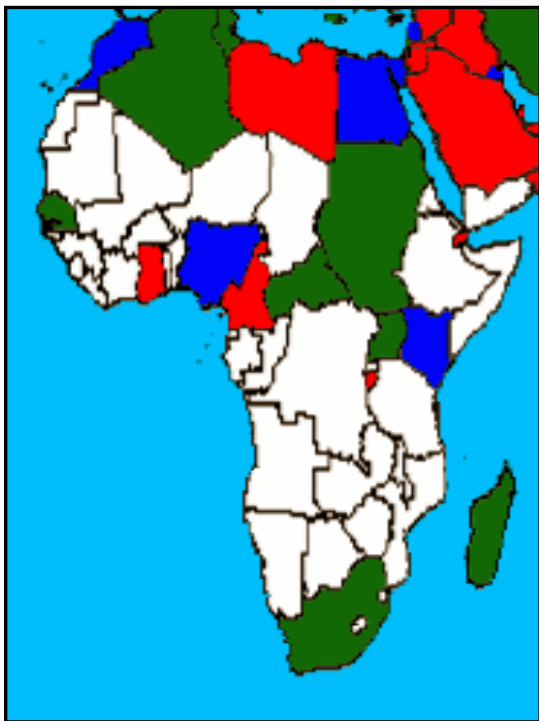


- **Previously no consistent surveillance in sub-Saharan Africa**
- **High regional threat of avian and pandemic influenza**
- **Goals:**
 - **Isolate and characterize influenza virus strains and other ILI viral causes**
 - **Part of global influenza surveillance network**
- **Protocol**
 - **Max of five (5) ILI samples per day per site**
 - **Transport at -80 degrees to Kenyatta Hospital, NIC, Nairobi**
 - **Flu A isolates sent to CDC-KEMRI Virus Research Lab (VRL) and Air Force's reference lab at AFIOH**



USAMRU-K

Highlights of AI/PI Work in FY06



- Surveillance on Jul-Oct 06 at 5 sites in Kenya
- Large catchment areas in NE, NW-Uganda, West Lake Victoria, Central and SW Coastal regions
- BSL-2 lab capable for primary culture & rapid testing
- No BSL-3 capability needed here, CDC-KEMRI VRL conducting culture work





USAMRU-K

Existing Sites



- **Malindi District Hospital, SE Coastal region**
- **Isiolo District Hospital, NE region**
- **Alupe Sub-District Hospital, Busia, NW region-Ugandan border**
- **Mbagathi District Hospital, Nairobi**
- **Kondele Children's Hospital, Kisumu, West, Lake Victoria region**



National Influenza Center (NIC) Kenyatta Hospital





USAMRU-K

Future Efforts in FY07 (1 of 2)



- **Kenya:**
 - Lol with CDC-KEMRI: BSL-3 work of influenza A samples at Virus Research Laboratory (VRL)
 - MOA with AFIOH: Shipping, specimen processing, and genetic sequencing
 - NIC, Kenyatta Hospital: Culture and identification of non-H5N1 influenza strains
 - Future sites in Western Highlands (Kericho) and Lake Victoria (Kisii) regions
 - Establish mil-mil collaboration with Kenyan DoD (4-5 sites)

USAMRU-K

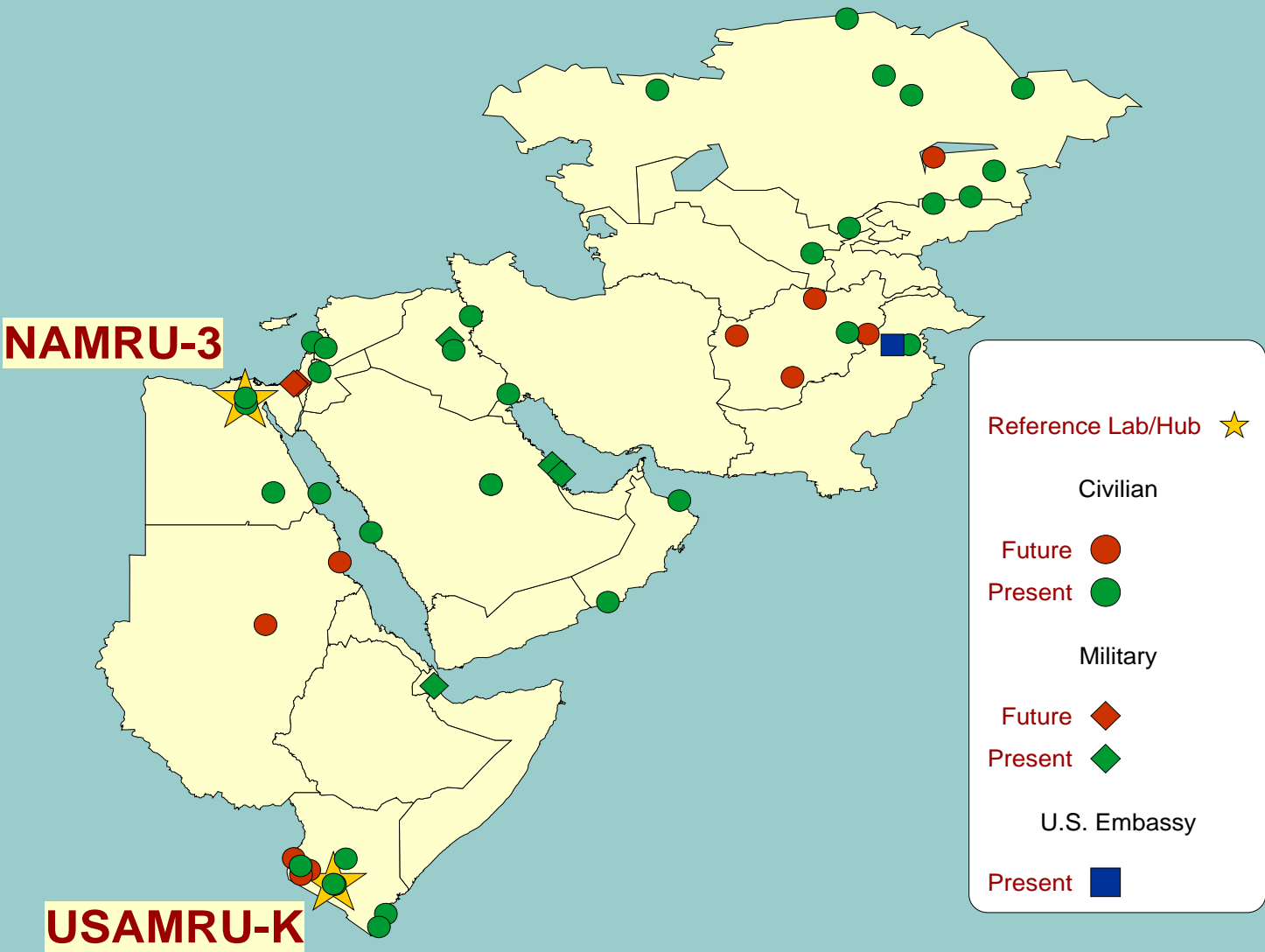
Future Efforts in FY07 (2 of 2)



- **Uganda:**
 - Agreement with Makerere Univ (Kampala) through HJF-MRI
 - Human surveillance: 3-4 hospital sites
- **Cameroon:**
 - Agreement with Univ of Buea (Yaounde) through HJF-MRI
 - Human surveillance: 3-4 hospital sites
- **Nigeria:**
 - Establish mil-mil collaboration with Nigerian MoD (4-5 sites)
 - Pending additional funding in FY07



**Naval Medical Research Unit
Number 3
(NAMRU-3)
Cairo, Egypt**



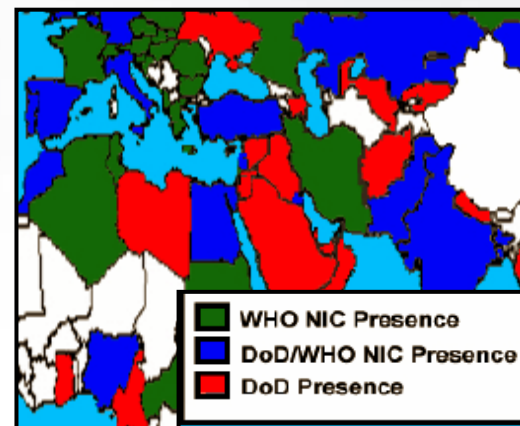


NAMRU-3

BSL-3 Laboratory Capability



- **EMRO Regional Influenza Reference Center for the WHO (23 countries)**
- **Training of region's country lab personnel (90 scientists from 18 countries trained)**
- **Only region's lab with full capability for H5N1 testing (PCR and culture)**
- **Rapid response capability (14 outbreaks & 6 assessments)**





NAMRU-3

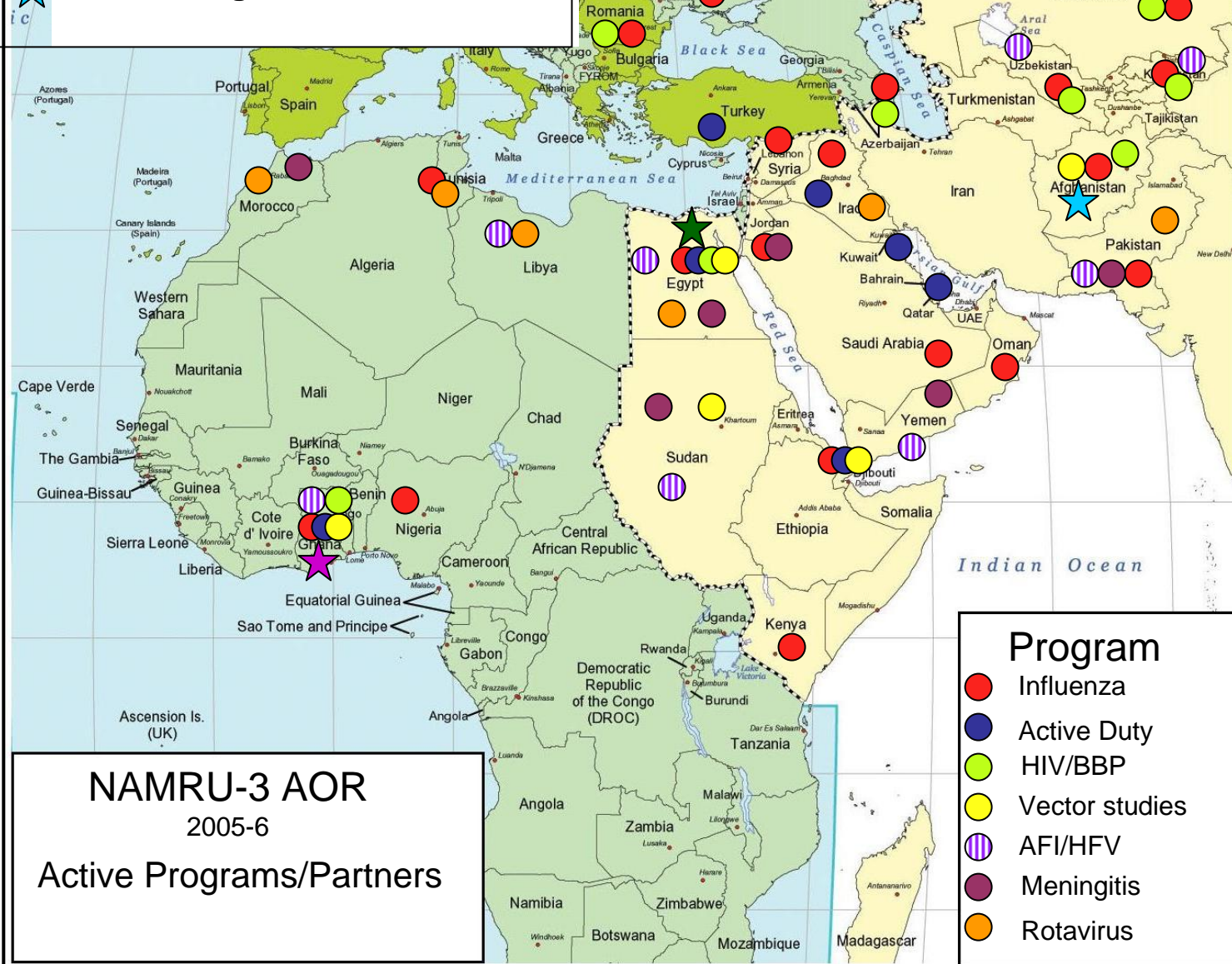
Highlights of AI/PI Work in FY06/07



- **Seasonal human and animal surveillance**
 - Over 30 locations and clinical centers
 - 19 countries in Africa, East Europe, the Middle East and the FSU:
 - Future plans to add 6 other countries in the region
- **Assisting Jordanian MoH with Influenza Surveillance Network**
- **Assisting Libyan MoH to develop an Influenza Reference Laboratory in Tripoli**



- ★ NAMRU-3
- ★ Ghana Detachment
- ★ UN-FAO Afghanistan Detachment





NAMRU-3

Highlights of AI/PI Work in FY06/07



- **Approx 500 human specimens obtained during influenza seasonal surveillance and outbreak investigations:**
 - 26 (5%) tested positive for H5N1
- **Over 2,700 avian specimens obtained during AI surveillance and outbreak investigations:**
 - 86 (3%) tested positive for H5N1
- **Ongoing coordination for co-location of CDC's Global Disease Detection (GDD) and response unit (separate funding by DHHS)**



NAMRU-3

Major Investigations in FY05-06



- **Egyptian MoH and CDC:** Supported H5N1 case investigations
- **Djibouti:** Coordination with CDC for investigation in Somali border
- **Kabul, Afghanistan:** Supported AI investigations and opening of MoH-based central reference lab
- **Azerbaijan:** Support in AI investigations





**Naval Medical Research
Center Detachment
(NMRC-D-Lima)
Lima, Peru**

SOUTHCOM

NMRCD-Lima

Reference Lab/Hub ★

Civilian

Future ●

Present ●

Military

Future ◆

Present ◆



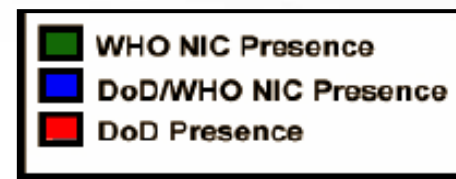


NMRC-Lima

Highlights of AI/PI Work in FY06/07

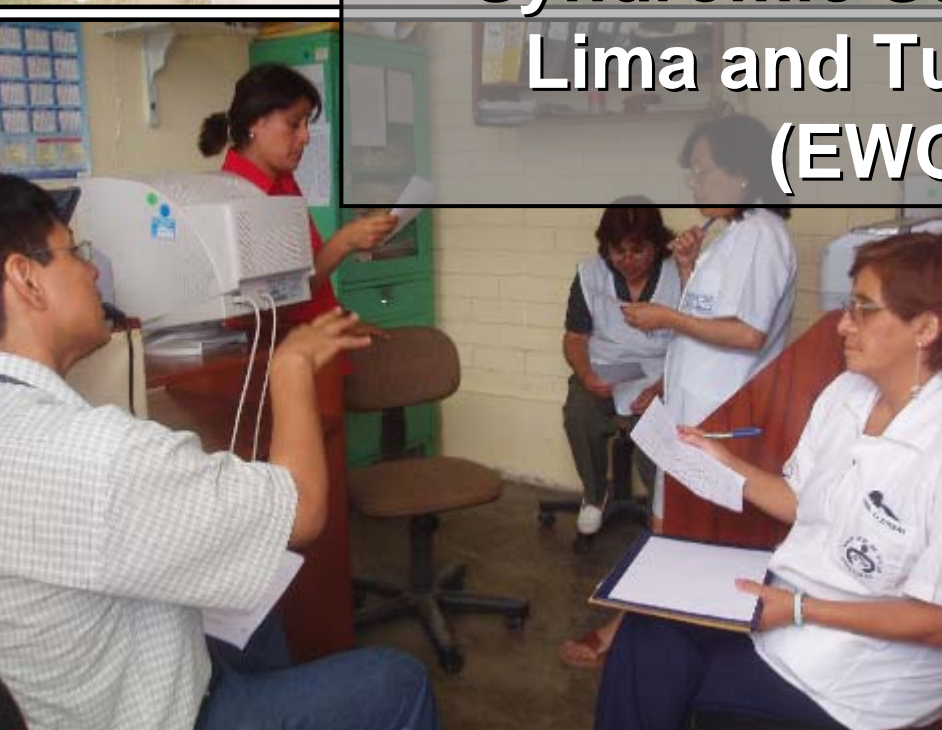


- **Respiratory disease surveillance (over 6 years)**
 - FY00-05 under Project Gargle (12 sites)
 - Lab capacity: 300-400 samples
 - FY06: 35 clinic/hospital sites in 6 countries
 - FY07: Expansion to 71 sites in 10 countries
 - Lab Capacity: ~ 3,000-4,000 samples
- **Increased capability for cell culture of viral pathogens & PCR testing (under BSL-2 +)**
- **New BSL-3 suite: Completion mid-FY07**
- **EWORS-based surveillance in 9 sites**
- **Alerta-DISAMAR syndromic surveillance reporting in Peruvian Navy and expanding to Peruvian Army bases**





Syndromic Surveillance in Lima and Tumbes, Peru (EWORS)





Alerta-DISAMAR Syndromic Surveillance Peruvian Military



- Started on Jan 03
- 97.5% of the Peruvian Navy covered (125,000)
- 43 reporting units
- 19 ships off-coast
- Daily reporting with cell phone notification
- Biweekly analysis for each site (via internet)
- Expansion to 5 other militaries in region



AI/PI Surveillance and Response Enhancements in FY06-07



Capability	FY05	FY06	FY07	Comment
Total # Countries in Network	30	56	65	Increases in S Amer, Africa, Mid East, SE Asia
Sampling Capacity # Specimens / year	~9000	~16000	~18000	Increased surge capacity and improved analysis capability
# Biosafety Level 3 Labs in Network	3	4	8	FY06-USAMRIID, AFIOH, AFRIMS-Vet Med & NAMRU-3 FY07-LRMC, 18 th MEDCOM, NHRC & AFRIMS-Virology Dept
Data Integration	No	Yes	Yes	Coord Center: synthesis for leadership, 24/7





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